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Cost Analysis of Proposed Changes to 40 CFR (Code of Federal Regulations) Part 600 to Improve Fuel Economoy Labeling and the Fuel Economy Data Base

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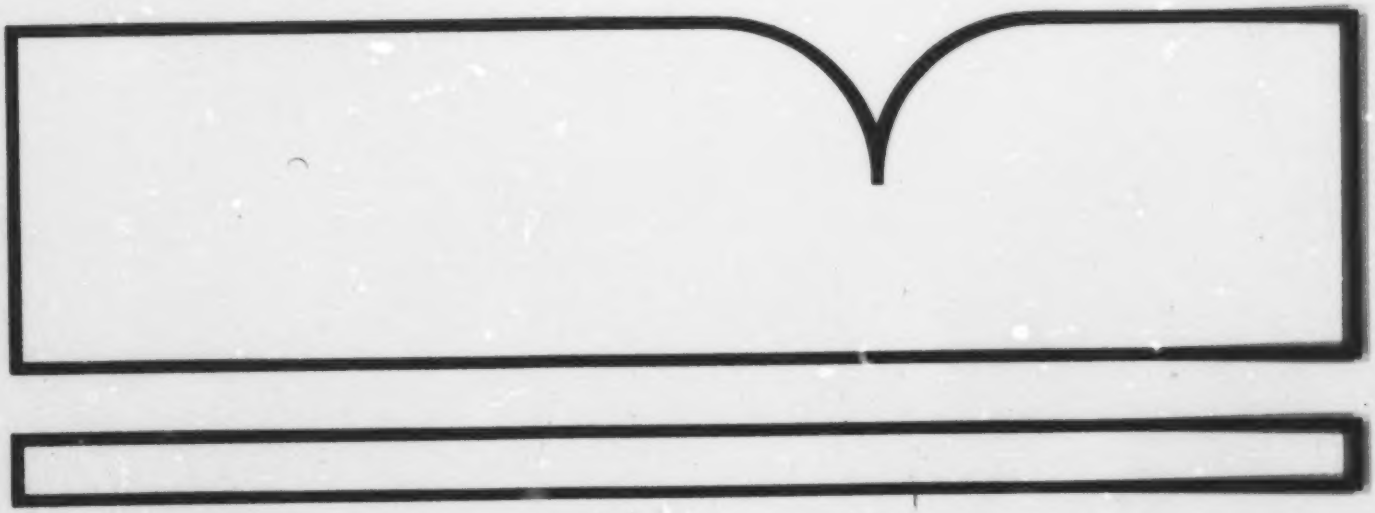

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This analysis has been written to estimate the economic impact on the automotive industry of the various rule changes proposed in the Notice of Proposed Rulemaking (NPRM) entitled 40 Code of Federal Regulations Part 600 Fuel Economy of Motor Vehicles-Revisions to Improve Fuel Economy Labeling and Fuel Economy Data Base.

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Technical Report

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I. Introduction

The following analysis has been completed to estimate the economic impact on the automotive industry of the various rule changes proposed in the Notice of Proposed Rulemaking (NPRM) entitled 40 CFR Part 600 Fuel Economy of Motor Vehicles--Revisions to Improve Fuel Economy Labeling and the Fuel Economy Data Base. This analysis supersedes the January 1981 analysis of the same title.

II. Organization of Analysis

The analyses in this paper are grouped in the same order as each proposal discussed in Section II of the NPRM. The estimated cost of the various proposals are summarzied in Table I of this analysis.

III. Proposed Modifications

A. In-Use Adjustments for Label Values

This NPRM proposes constant shortfall adjustment factors to be applied to model type fuel economy values to arrive at the label values. This specific proposal will not change the number of labels nor the number of tests required under the current program. The impact of this proposal on the current program will be in the calculation procedures only. EPA computer personnel estimate that no more than eight hours would be needed per manufacturer to make the required computer program changes. An additional eight hours of programming time per computer might be allocated for implementing the software on computers located at several assembly sites. It was estimated on the basis of data from the Motor Vehicle Manufacturers Association that there are approximately 100 assembly sites.[1] Assuming the worst case that all manufacturers have computer systems for generating label values, the total cost of this proposal would be: the number of manufacturers times the estimated reprogramming hours per manufacturer, plus the number of hours required per computer for implementation, all multipled by the cost per hour of computer programmer work. At an estimated $30 per hour for programming (based on prevailing contractor rates), the total cost would be $47,000;

1. Motor Vehicle Manufacturers Association of the United States, Inc. Information Handbook: Facilities, 1980.

((32 mfrs)(24 hrs per mfr) + (100 computers)(8 hrs per computer)) $30 per hr.

= $47,040

B. Minimum Data Requirements for Labeling

The current program allows that any base level,[2] where certification data satisfied the minimum data requirements, could be represented only by a low sales volume group of vehicles. This proposal will require that each base level have data generated from a vehicle which represented the highest selling configuration in the base level. This should not increase annual data requirements for initial labels over the current system because each manufacturer must currently supply data to meet the requirements for their preliminary corporate average fuel economy (PCAFE). The current minimum data requirement for preliminary CAFE is that data be provided on configurations that represent at least 90 percent of the projected sales, in decreasing order. As a result, this proposed change in data coverage represents a "pull ahead" in coverage for initial labeling and not an increase in annual data requirements. Because of this, it is estimated that this change would not result in a testing cost increase to the manufacturers for initial labels. Any cost attributable to pulling ahead testing is likely to be insignificant. The following section covers costs attributed to the minimum labeling data proposal as they apply to labeling subsequent to the initial labels.

C. Label Updating

This NPRM proposes two types of label updating. First, relabeling at approximately the middle of the production year will be required and, second, label updating will be required any time during the production year design changes have been incorporated that increase any one of three specific design parameters beyond their highest tested value. In the first case, the manufacturer must relabel if any decrease in fuel economy results, and in the second case, the manufacturer will only relabel if the fuel economy decreases by a specific amount.

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2. For a review of the technical terms associated with the fuel economy, see: EPA Report No. EPA-AA-CPSB-82-02, "Current Fuel Economy Program," September 1982.

1. Mid-Year Label Updating

There are three basic costs associated with the proposal to update label values at mid-year. These costs are: updating the sales projections, recalculating the label values, and the cost associated with the minimum data requirements.

The costs associated with sales projection updating cannot accurately be predicted as each manufacturer has its own technique to forecast sales and we do not have basic data on the resources expended in these forecasts. However, for this analysis we will present what we believe to be reasonable estimates. If comments to this rulemaking indicate our estimates are significantly understated, we will update this analysis for the final rule.

For the seven major manufacturers, which account for 90 percent of current production sales, we will assume one person week will be expended in updating the sales projections. For the remaining 25 manufacturers we will assume two person days will be expended in updating the sales. We will also assume the person assigned to this task will be at the same technical level as the programmer in Section "A", above an hourly cost of $30 per hour. The estimated cost for sales updating is the number of manufacturers times the cost per manufacturer or,

$$\begin{aligned}\text{Cost of Sales Updating} &= [(7 \text{ mfrs.})(40 \text{ hrs}) + \\ &\quad (25 \text{ mfrs})(16 \text{ hrs})] \ \$30/\text{hr.} \\ &= \$20,400.\end{aligned}$$

The cost of recalculating the actual label values would involve recalculating the label values and then updating the computer at each manufacturing site. Since the actual fuel economy data will already be in the data base as well as the updated sales, our estimate is that it will take 2 hours of a programmers' time per manufacturer to recalculate the label values for their product line. In addition, assuming $30 per hour programmer cost, 100 assembly sites and that it would take four hours to update each on-site computer, the cost of recalculating would be:

$$\begin{aligned}\text{Cost of Recalculating} &= [(32 \text{ mfrs})(2 \text{ hrs per mfr}) + \\ &\quad (100 \text{ sites})(4 \text{ hrs per site})] \\ &\quad \$30/\text{hr.} \\ &= \$13,920\end{aligned}$$

Under the current system over 90 percent of the labels are changed at least once prior to proposed mid-year updating time. The current need for updating these labels comes about because the values on each label depicting the

range of comparable fuel economy from similiar vehicles change and, therefore, the manufacturers are already relabeling to incorporate this revised range at the proposed mid-year time period. Because the majority of manufacturers are already relabeling at the mid-year time period, albeit to change the range values, including changed fuel economy values on the labels will not result in cost increase for the manufacturers.

Because this proposal will also require the same data coverage (assuming B above is adopted) as is being proposed for initial labels, there will be some additional testing burden. An analysis was made of the 1980 data base to determine what impact this proposal would have on testing resources. (The 1980 data base was selected because it is the latest model year for which the final CAFE calculations are complete for the industry.) Since we do not have a way to know when any running change will be put into production (or if it will be) it is extremely difficult to determine what a particular manufacturer's product line will "look" like at mid-year and thus, what if any additional tests would be required to have the proposed minimum data coverage. The way we estimated the testing impact was to look at the product line configuration at the end-of-year and compare it to the product line coverage at the time the labels were first calculated. This is worst case in that all the testing requirements will be assumed to have occurred prior to the mid-year relabeling time and further that none of the other proposed changes in this rulemaking would cause the manufacturers to minimize design changes after initial labeling.

In the 1980 model year data base, 39 of the 860 base levels did not have the highest selling configuration represented at the end of the year. This would indicate that approximately 40 additional tests would be required to satisfy the mid-year relabeling data requirements. In a review of the testing trends of fuel economy data vehicles it was noted that 80 percent of these vehicles were reconfigured vehicles. Thus, 32 of the above identified tests would most likely be performed on reconfigured vehicles and 8 tests on new vehicles.

In a recent review of vehicle costs from data submitted from several manufacturers the following costs were derived:

A new vehicle	$23,200/vehicle
A reconfigured vehicle	$1,500/vehicle
Test Cost	$1,450/test
Mileage accumulation	$1.82/mile
Typical mileage at the first test point for a new fuel economy data car	4,000-miles

Typical mileage accumulated between tests on a reconfigured vehicle 500-miles

The resulting cost per test for new and reconfigured vehicles is as follows:

New prototype vehicles cost per test = (vehicle cost) + (mileage accumulation costs) + (cost/test) = ($23,200/vehicle) + ($1.82/mile x 4,000 miles) + ($1,450/test) = $31,930

Reconfigured vehicle cost per test = (vehicle cost) + (mileage accumulation costs) + (cost per test) = ($1,500/vehicle) + ($1.82/mile x 500 miles) + ($1,450/test) = $3,860

Using the above information the minimum data costs will be:

Vehicle Costs for Minimum Data Coverage = (new vehicle) x (no. tests) + (reconfigured vehicle) x (number of tests) = ($31,930) x (8 new tests) + ($3,860) x (32 new tests) = $378,960

The total cost for mid-year relabeling would be: sales updating cost plus label recalculation costs plus the cost of any additional vehicle requirements or,

Mid-Year Relabeling Cost = (sales updating) + (recalculation) + (additional vehicles) = $20,400 + $13,920 + $378,960 = $413,280

2. Relabeling Due to Design Changes

The second proposal for relabeling is to require the manufacturers to recalculate any label that has had base levels within the model type affected by any one of three specific design changes. Then, if the recalculated label values have decreased by a specific amount the manufacturers would have to relabel.

In reviewing the 1982 model year data base 115 of the 850 running changes involved one of the three specific design changes which could trigger a recalculation, depending on whether the changes decreased fuel economy. This would not equate to 115 additional tests because the proposal will only require additional data if inertia weight, road-load horsepower, or axle ratio are increased beyond the range represented

by test data by significant amounts. For example, if the highest tested axle ratio was 3.00 a manufacturer would have to submit data and recalculate if an axle of 3.30 was added (10 percent above largest tested). Based on the recalculations, the manufacturer would relabel only if the recalculation indicated a decrease in fuel economy of 1.0 mpg or more for the city value or, 2.0 mpg or more for the highway value.

In a review of one manufacturer's 1982 running change submissions, less than half of the applicable running changes increased the values above the tested range. For this analysis, half of the running changes are assumed to trigger the need for recalculations.

In order to prorate the recalculation costs ($20,400 for sales updating and $13,920 for recalculation)[3], the following assumptions were made: First, each running change would affect one base level. This is likely a worst case assumption in that several axle ratios could be added to the same base level and only one of these (the largest numerical) need be tested. The second assumption is that each base level affects three label values. This is appropriate because the domestic manufacturers frequently have five or more labels affected by a single base level and each base level in a foreign manufacturer's product line usually affects one label and sometimes two labels.

Using the above assumptions, the 115 running changes (r/c's) would change 173 labels.

(115 r/c's) x (0.5 of total r/c's triggering recalculation) x (3 base level per r/c) = 173

These 173 labels represent 11 percent of all 1982 labels and would cost the industry approximately $3,800 to recalculate.

Recalculation cost due to design changes =
[(sales updating) + (recalculation)] x
(fraction of labels affected)

= [($20,400) + ($13,920)] 0.11

= $3,775

3. See Section C.I for details on these data.

The additional data costs to update for design changes will be the number of vehicles multiplied by vehicle costs. Since all of the data will be running change data it is appropriate to assume that all of the data will be generated using reconfigured vehicles. The approximate cost will be:

Additional Data Costs = (reconfigured vehicles) (no. of tests) = ($3,860 per vehicle)(117 x .5) = $225,810

The total cost for updating label values due to design changes made during the model year is thus estimated to be:

Updating Due to Design Changes = (recalculation) + (additional data costs) = $3,775 + $225,810 = $229,585

D. Modifications to the Label Information

The current fuel economy program requires one value to be depicted on the label, the city value. This proposal will require two numbers (a city and highway value) be depicted on the label. In addition, two standard formats are proposed, one of which will be adopted in the final rule. For the purpose of this analysis, both of these changes will require a new label format and some programming changes. At an estimated 24 hours for art work and reprogramming, $30 per hour for art work and programming, and 8 hours to implement the software changes on each of 100 manufacturer computers, the estimated total cost of this proposal would be:

[(32 mfr)(24 hours) + (100 computer) (8 hours/computer)]($30/hr.) = $47,040

This cost does not reflect the time savings that will be realized by the manufacturers by having a standard label format which will eliminate all advance EPA approval of the formats.

E. Proposed Technical Amendments to Cut Cost and Improve the Data Base

1. Elimination of the Preliminary CAFE Calculation

The proposed regulations would eliminate the preliminary CAFE and require that the final CAFE simply include the data from vehicle configurations with total production volumes of at least 90 percent of the manufacturer's total

model year production. Currently, preliminary CAFE data are required from the vehicle configurations which, taken in order of decreasing sales, represent 90 percent or more of the sales of each significant base level and at least one test in each nonsignificant base level.

This proposal would result in some decrease in testing and in other administrative costs associated with the preliminary CAFE. First, the paperwork and personnel time associated with the generation of the preliminary CAFE would be eliminated. This time currently involves both the original generation of the preliminary CAFE values and recalculations to include base levels added to manufacturers' product lines after the initial calculation of the preliminary CAFE. Second, the requirement of 90 percent coverage across the product line, instead of coverage of the top 90 percent of each significant base level as required for the preliminary CAFE, would provide manufacturers greater flexibility in the selection of test vehicles. Third, test vehicles can be more precisely targeted to represent actual sales for the calculation of the CAFE rather than estimated sales for calculation of the preliminary CAFE which is calculated early in the model year, reducing the need for additional tests where sales projections were inaccurate. Finally, whereas the bulk of the final CAFE data are currently required to be included in the preliminary CAFE submitted early in the model year, eliminating the preliminary CAFE allows testing to meet CAFE requirements to be spread out more evenly over the year resulting in less need for overtime and more efficient use of testing facilities.

If the preliminary CAFE were eliminated resources expended in compiling the list of all of the vehicles, data vertification, data requirements, etc., would be significantly reduced. Thus, a very conservative estimate for the industry assumes a time savings of 12 40-hour person work weeks would likely be realized by each of the seven largest manufacturers.

(7 mfrs)(12 weeks per mfr)
(40 hours per week)($30 per hour) =
$100,800

Additional smaller time and cost savings would be realized by the other manufacturers but is not accounted in this analysis.

The elimination of preliminary CAFE along with relaxing the data requirements for the final CAFE calculations should result in a reduction in the number of test vehicles. In 1981, there were over 200 tests which were conducted soley for CAFE purposes. With the simplified and more flexible test requirements, each manufacturer will be able to more precisely target the need for test vehicles. While it is not possible to accurately determine the test savings, we believe it well

within reason to expect a reduction in the number of test vehicles from 200 to 190 or five percent. As indicated in Section "C," 80 percent of the tests are performed in reconfigured vehicles with the remainder requiring new vehicles.

New Vehicle Cost Savings = (vehicle costs) x (no. of tests)
= ($31,930) x (2)
= ($63,860)

Reconfigured Vehicles Cost Savings = (cost per test) x (no. of tests)
= ($3,860) x (8)
= $30,880

Total Cost savings = New Car + Reconfigured
= $63,860 + 30,880
= $94,740

Elimination of the preliminary CAFE would also eliminate the exemption from submitting running change fuel economy data where a manufacturer's preliminary CAFE level is sufficiently above the applicable model year standards. About 17 percent, or 22, of the fuel economy test requirements are annually eligible for exemption. Using the cost of reconfigured vehicle the cost of discontinuing the running change exemption provision would be:

Cost = [(reconfigure vehicle) +
(mileage accum) + (cost of test)]
(No. of tests) =
[($1,500 per vehicle) + ($1.82 per mile)
(500 miles) + ($1,450 per test)](22) = $84,920

Thus a conservative estimate of the net savings from this proposal would be over $110,000 annually:

Cost = Additional Cost of Running Change Testing - Cost Savings from Elimination of the Preliminary CAFE Calculation - Cost Savings from Decreased Testing Because of More Precise Targeting of Test Vehicles

= $84,920 - $100,800 - $94,740
= - $110,620

2. Fuel Economy Adjustments for High Mileage Test Vehicles

Currently, the regulations allow a maximum mileage accumulation of 10,000 miles for fuel economy vehicles. This proposal will continue to allow a maximum of 10,000 miles. However, under this proposal all fuel economy data generated on a vehicle/engine system combination with over 6,200 miles will be adjusted to approximate the fuel economy at 4,000 miles. This proposal will not increase the number of tests required since running beyond 6,200-mile is still an option.

3. Drive Train Separation

This part of the proposal recommends that front- and rear-wheel drive systems be separated into different base levels. Since we are already separating these drive systems under the general authority of the current regulations this part of the proposal simply makes current practice explicit in the regulations. No additional costs will be involved. In addition to the drive system separation, above, lockup automatic transmissions and all transmissions with overdrive gearing will be separated into separate fuel economy base levels. Since there are very few cases where this separation would be involved, this proposal has no significant industry-wide impact.

4. Interior Volume

Changes are being proposed to the measurement methodology to account for (1) hatchback and station wagon interior volume, (2) driver and front-seat leg room, and (3) luggage measurements if the two-seater vehicle classification. These proposed changes will not affect the number of labels, test vehicles, or the vehicle classificaton system and, as a result, should not impose any additional cost on the industry.

IV. Summary

The annual cost of all of the proposals in this NPRM package for all manufacturers is estimated to be $626,325.

The attached table summarizes the estimated cost or each proposal. Some cost savings to manufacturers which are difficult to quantify, such as the possiblity of more efficient use of test facilities because of the elimination of the PCAFE, have not been calculated and included in the net cost of the proposals in the NPRM.

Cost Summary of the Proposed Rulemaking

Regulation Issue	Estimated Cost
1. In-Use Adjustment	$ 47,040
2. Minimum Data Requirements	Negligible
3. Relabeling	
a. Mid-year	$413,280
b. Design Changes	$229,585
4. Label Format	$ 47,040
5. Technical Amendments	
a. Eliminate PCAFE	-$110,620
b. High Mileage Adjustment	-0-
c. Drive Train Separation	-0-
d. Interior Volume	-0-
Total	$626,325